

BUMPER "BETWEEN PAPERS" PRACTICE SUITABLE FOR HIGHER TIER ONLY

SUMMER 2023 QUESTIONS

NOT A "BEST" GUESS PAPER.

**NEITHER IS IT A "PREDICTION" ... ONLY THE EXAMINERS KNOW WHAT IS GOING TO COME UP! FACT!
YOU ALSO NEED TO REMEMBER THAT JUST BECAUSE A TOPIC CAME UP ON PAPER 1 IT MAY STILL COME
UP ON PAPERS 2 OR 3 ...**

**WE KNOW HOW IMPORTANT IT IS TO PRACTICE, PRACTICE, PRACTICE SO WE'VE COLLATED A LOAD OF
QUESTIONS THAT WEREN'T EXAMINED IN THE PEARSON/EDEXCEL 9-1 GCSE MATHS PAPER 1 BUT WE
CANNOT GUARANTEE HOW A TOPIC WILL BE EXAMINED IN THE NEXT PAPERS ...**

**ENJOY!
MEL & SEAGER**

Q1. Work out $1\frac{3}{4} + 3\frac{1}{2}$

(Total for question = 1 mark)

Q2. Work out $\sqrt{\frac{2.5 \times \sin 43^\circ}{8.2^2 - 50.5}}$

Give your answer correct to 3 significant figures.

(Total for question = 2 marks)

Q3. $p = \sqrt{\frac{2e}{f}}$

$e = 6.8$ correct to 1 decimal place.

$f = 0.05$ correct to 1 significant figure.

Work out the upper bound for the value of p .

Give your answer correct to 3 significant figures. You must show all your working.

(Total for question = 3 marks)

Q4. A number, m , is rounded to 1 decimal place.

The result is 9.4

Complete the error interval for m .

..... $\leq m <$

(Total for question = 2 marks)

Q5. The diagram shows the floor plan of Mary's conservatory.

Mary is going to cover the floor with tiles.

The tiles are sold in packs.

One pack of tiles will cover 2m^2

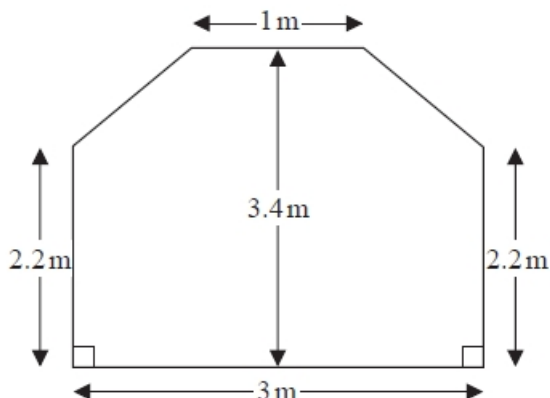
A pack of tiles normally costs £24.80

Mary gets a discount of 25% off the cost of the tiles.

Mary has £100

Does Mary have enough money to buy all the tiles she needs?

You must show all your working.



(Total for question = 5 marks)

Q6. Charlie invests £1200 at 3.5% per annum compound interest.

Work out the value of Charlie's investment after 3 years.

£.....

(Total for Question is 3 marks)

Q7. (a) Work out $2\frac{1}{7} + 1\frac{1}{4}$

(2)

(b) Work out $1\frac{1}{5} \div \frac{3}{4}$ Give your answer as a mixed number in its simplest form.

(2)

(Total for question = 4 marks)

Q8. Work out $\frac{4 \times 10^9 + 3.2 \times 10^7}{1.6 \times 10^{-6}}$

Give your answer in standard form.

(Total for Question is 2 marks)

- Q9.** Bill's weight decreases from 64.8 kg to 59.3 kg.
Calculate the percentage decrease in Bill's weight.
Give your answer correct to 3 significant figures.

(Total for Question is 3 marks)

- Q10.** Jarek uses the formula $Area = \frac{1}{2} ab \sin C$ to work out the area of a triangle.

For this triangle,

$a = 7.8$ cm correct to the nearest mm.

$b = 5.2$ cm correct to the nearest mm.

$C = 63^\circ$ correct to the nearest degree.

Calculate the lower bound for the area of the triangle.

cm²

(Total for question = 3 marks)

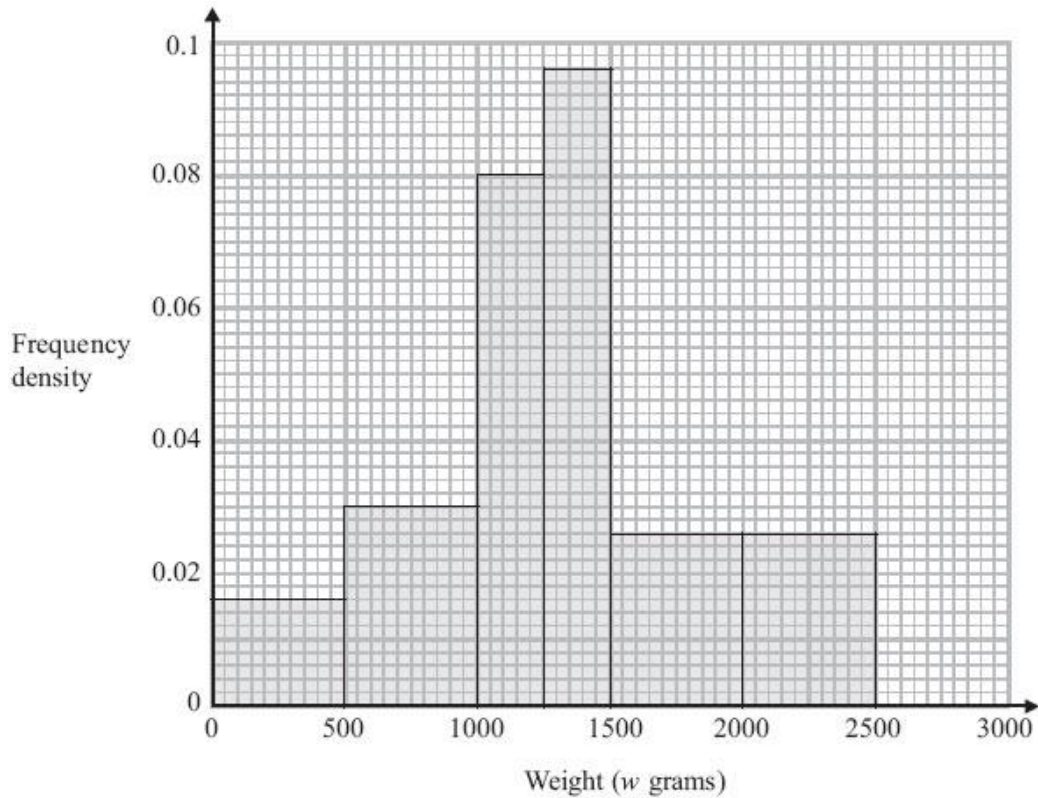
- Q11.** Here are two fractions: $\frac{7}{5}$ $\frac{5}{7}$

Work out which of the fractions is closer to 1
You must show all your working

(Total for question = 3 marks)

Q12. Jim went on a fishing holiday.

The histogram shows some information about the weights of the fish he caught.



(a) Use the histogram to complete the frequency table.

Weight (w grams)	Frequency
$0 < w \leq 500$	8
$500 < w \leq 1000$	
$1000 < w \leq 1250$	
$1250 < w \leq 1500$	
$1500 < w \leq 2500$	

(2)

Jim kept all the fish he caught with a weight greater than 2000 g.

(b) Find the ratio of the number of fish Jim kept to the total number of fish he caught.

(2)

(c) Use the histogram to find an estimate of the median.

(2)

(Total for Question is 6 marks)

Q13. Three solid shapes **A**, **B** and **C** are similar.

The surface area of shape **A** is 4 cm^2

The surface area of shape **B** is 25 cm^2

The ratio of the volume of shape **B** to the volume of shape **C** is $27 : 64$

Work out the ratio of the height of shape **A** to the height of shape **C**.

Give your answer in its simplest form.

(Total for question = 4 marks)

Q14. Prove algebraically that the recurring decimal $0.1\dot{7}\dot{8}$ can be written as the fraction $\frac{59}{330}$

(Total for question = 3 marks)

Q15.(a) Write 8.2×10^5 as an ordinary number.

(1)

(b) Write 0.000 376 in standard form.

(1)

(c) Work out the value of $(2.3 \times 10^{12}) \div (4.6 \times 10^3)$
Give your answer in standard form.

(2)

(Total for Question is 4 marks)

Q16. Using algebra, prove that $0.1\dot{3}6 \times 0.\dot{2}$ is equal in value to $\frac{1}{33}$

(Total for question = 3 marks)

Q17. Charlotte grows some potatoes. The table shows information about the weights of her potatoes.

Weight (w grams)	Frequency
$100 < w \leq 120$	5
$120 < w \leq 140$	25
$140 < w \leq 160$	30
$160 < w \leq 180$	15
$180 < w \leq 200$	5

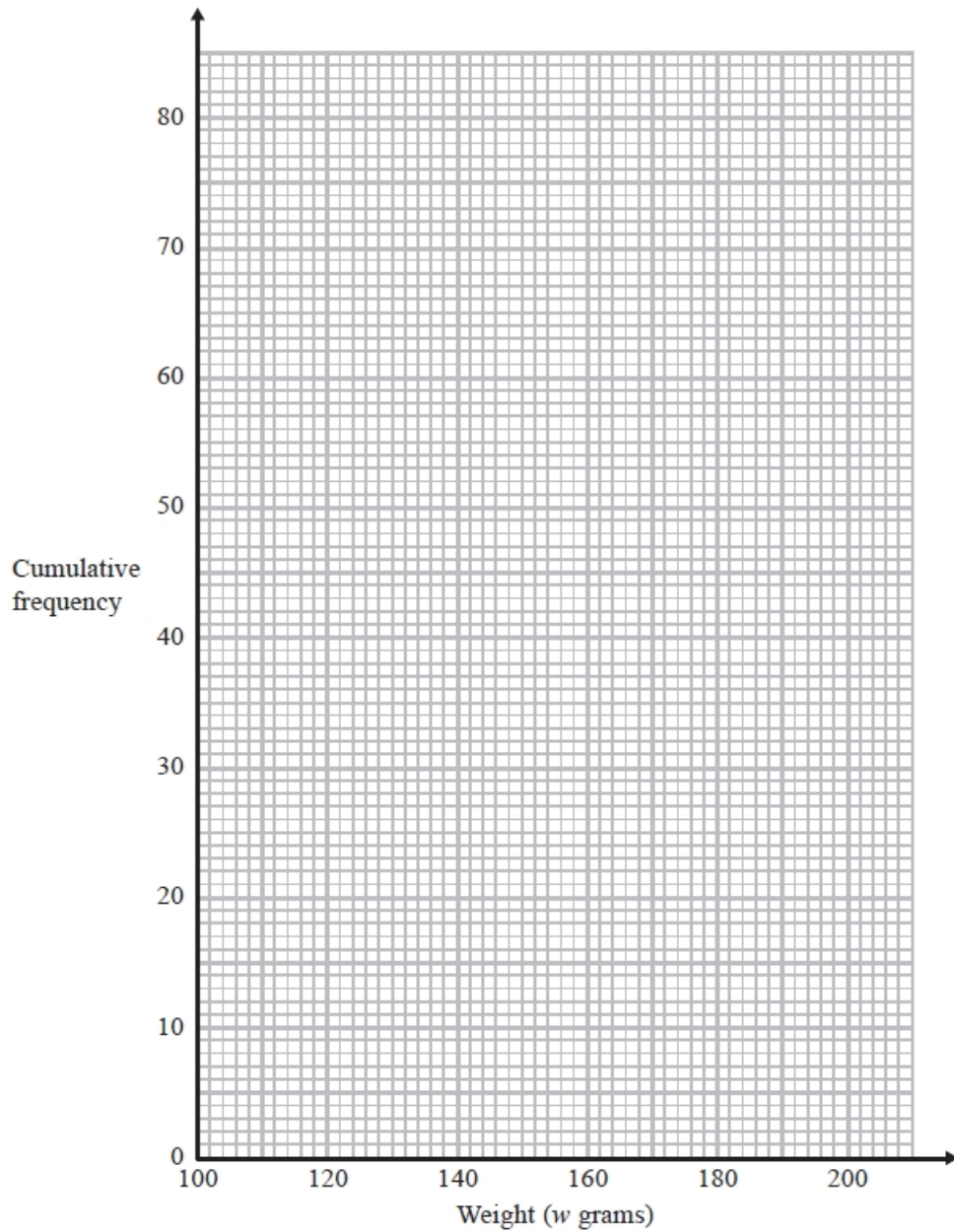
(a) Complete the cumulative frequency table.

Weight (w grams)	Frequency
$100 < w \leq 120$	
$100 < w \leq 140$	
$100 < w \leq 160$	
$100 < w \leq 180$	
$100 < w \leq 200$	

(1)

(b) On the grid, draw a cumulative frequency graph for your table.

(2)



(c) Use your graph to find an estimate for the interquartile range.

..... grams **(2)**

(d) Use your graph to find an estimate for the percentage of Charlotte's potatoes with a weight less than 150 grams.

..... % **(3)**

(Total for question = 8 marks)

Q18. Prove that $(2n + 3)^2 - (2n - 3)^2$ is a multiple of 8 for all positive integer values of n .

(Total for Question is 3 marks)

Q19. Tom and Amy set the alarms on their phones to sound at 6.45 am.

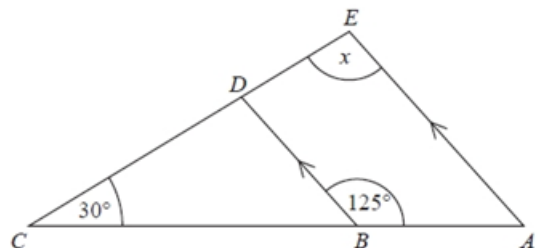
Both alarms sound together at 6.45 am.
Tom's alarm then sounds every 9 minutes.
Amy's alarm then sounds every 12 minutes.

At what time will both alarms next sound together?

(Total for question = 3 marks)

Q20. ABC and EDC are straight lines.
 AE and BD are parallel.
Angle $ABD = 125^\circ$
Angle $BCD = 30^\circ$

Work out the size of the angle marked x .
Give reasons for your answer.



(Total for question = 4 marks)

Q21. Derek buys a house for £150 000 He sells the house for £154 500

(a) Work out Derek's percentage profit.

(3)

Derek invests £154 500 for 2 years at 4% per year compound interest.

(b) Work out the value of the investment at the end of 2 years.

(3)

(Total for Question is 6 marks)

Q22. Find the value of the reciprocal of 1.6 Give your answer as a decimal.

(1)

Jess rounds a number, x , to one decimal place. The result is 9.8

(b) Write down the error interval for x .

(2)

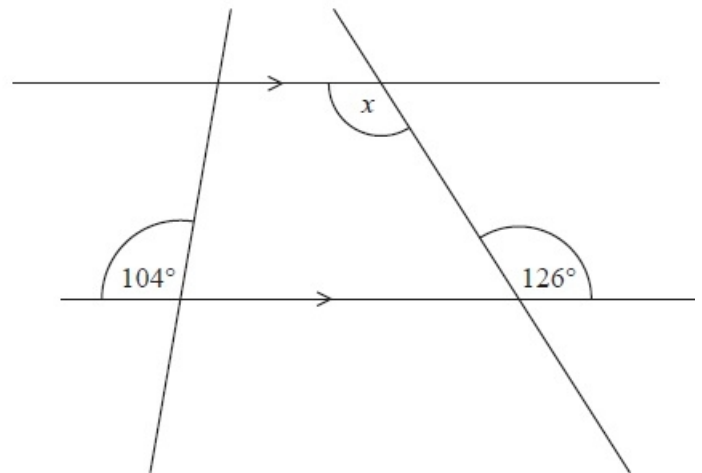
(Total for question = 3 marks)

Q23. Write 500 as a product of powers of its prime factors.

(Total for question = 3 marks)

Q24.

(i) Find the size of the angle marked x .



.....°

(ii) Give a reason for your answer.

(Total for Question is 2 marks)

Q25. In Spain, Sam pays 27 euros for 18 litres of petrol.

In Wales, Leo pays £40.80 for 8 gallons of the same type of petrol.

1 euro = £0.85

4.5 litres = 1 gallon

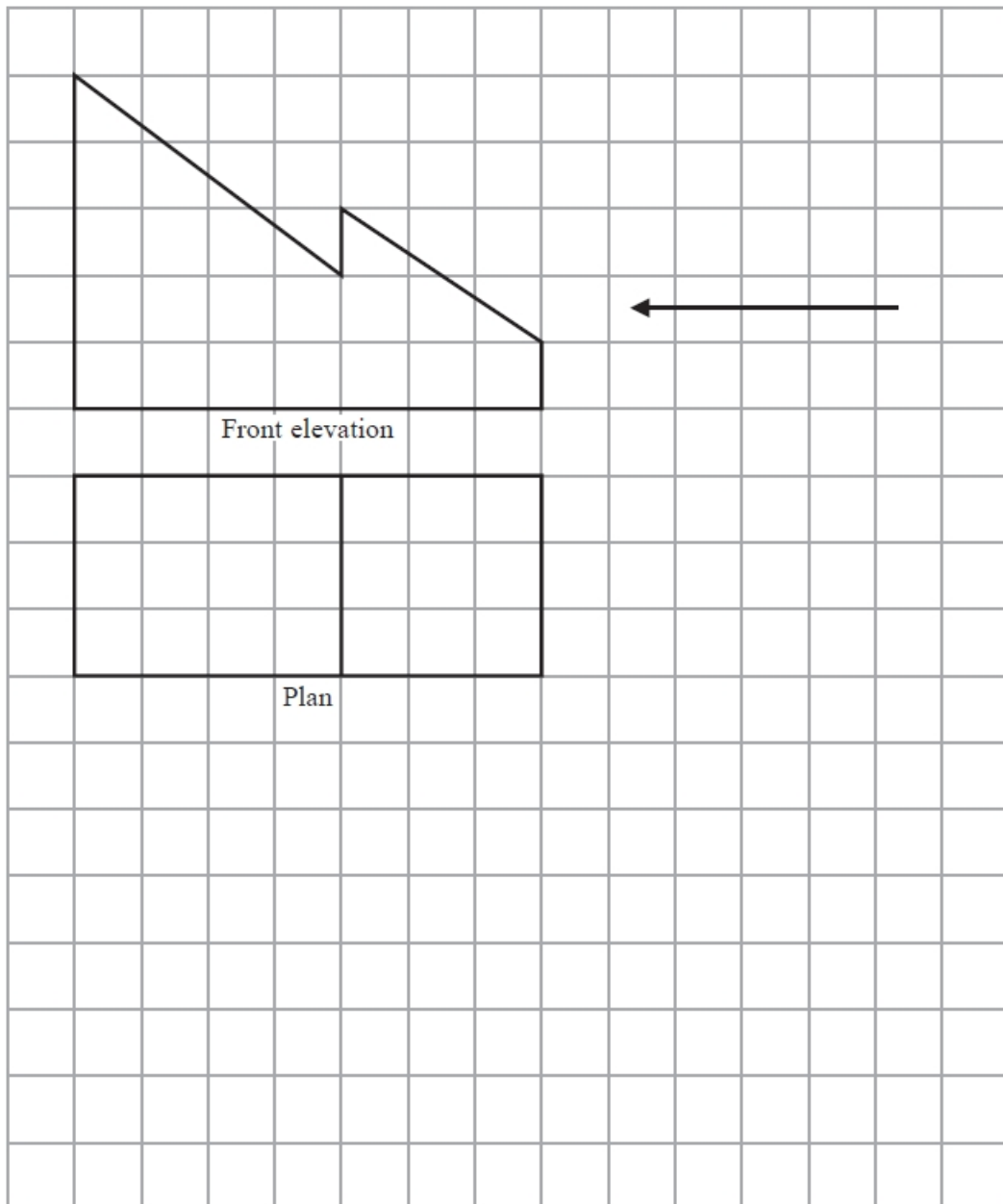
Sam thinks that petrol is cheaper in Spain than in Wales.

Is Sam correct? You must show how you get your answer.

(Total for question = 4 marks)

Q26. The front elevation and the plan of a solid are shown on the grid.

On the grid, draw the side elevation of the solid from the direction of the arrow.

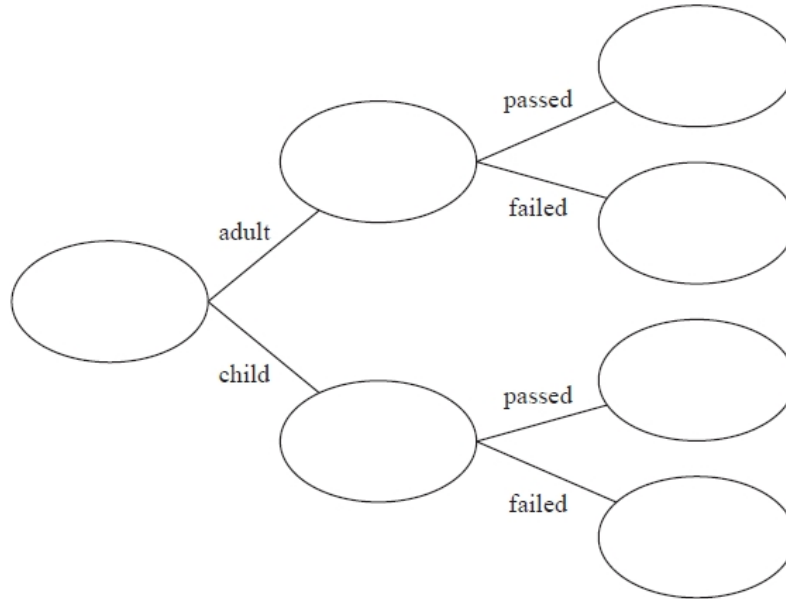


(Total for question = 2 marks)

Q27. 72 people did a test.

20 of the 32 adults who did the test passed.
 6 of the children who did the test failed.

(a) Use this information to complete the frequency tree.



(3)

One of these people is picked at random.

(b) Find the probability that this person is an adult who failed the test.

(2)

(Total for question = 5 marks)

Q28. The table shows information about the weekly earnings of 20 people who work in a shop.

Weekly earnings (£ x)	Frequency
$150 < x \leq 250$	1
$250 < x \leq 350$	11
$350 < x \leq 450$	5
$450 < x \leq 550$	0
$550 < x \leq 650$	3

(a) Work out an estimate for the mean of the weekly earnings.

£ **(3)**

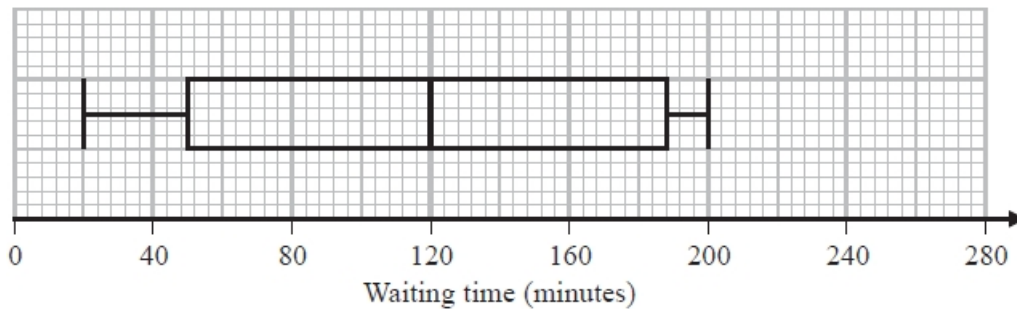
Nadiya says, "The mean may **not** be the best average to use to represent this information."

(b) Do you agree with Nadiya? You must justify your answer.

(1)

(Total for question = 4 marks)

Q29. The box plot shows information about the length of time, in minutes, some people waited to see a doctor at a hospital on Monday.



(a) Work out the interquartile range of the information in the box plot.

..... minutes (2)

(b) Becky says, "50% of the people waited for at least 2 hours." Is Becky correct? Explain why.

(1)

The table gives information about the length of time, in minutes, some people waited to see a doctor at the same hospital on Tuesday.

	Waiting time (minutes)
Shortest time	20
Lower quartile	50
Median	100
Upper quartile	140
Longest time	210

Becky was asked to compare the distribution of the lengths of times people waited on Monday with the distribution of the lengths of times people waited on Tuesday.

She wrote, "People had to wait longer on Tuesday than on Monday."

(c) Give **one** reason why Becky may be wrong.

(1)

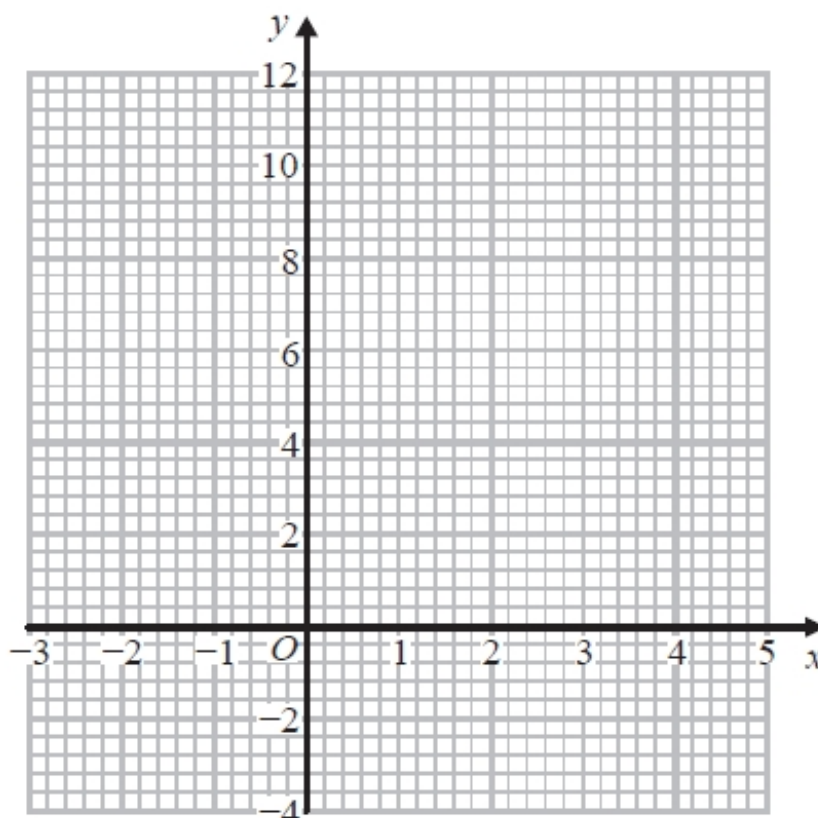
(Total for question = 4 marks)

Q30. (a) Complete the table of values for $y = x^2 - 3x + 1$

x	-2	-1	0	1	2	3	4
y	11		1	-1		1	

(2)

(b) On the grid, draw the graph of $y = x^2 - 3x + 1$ for values of x from -2 to 4



(2)

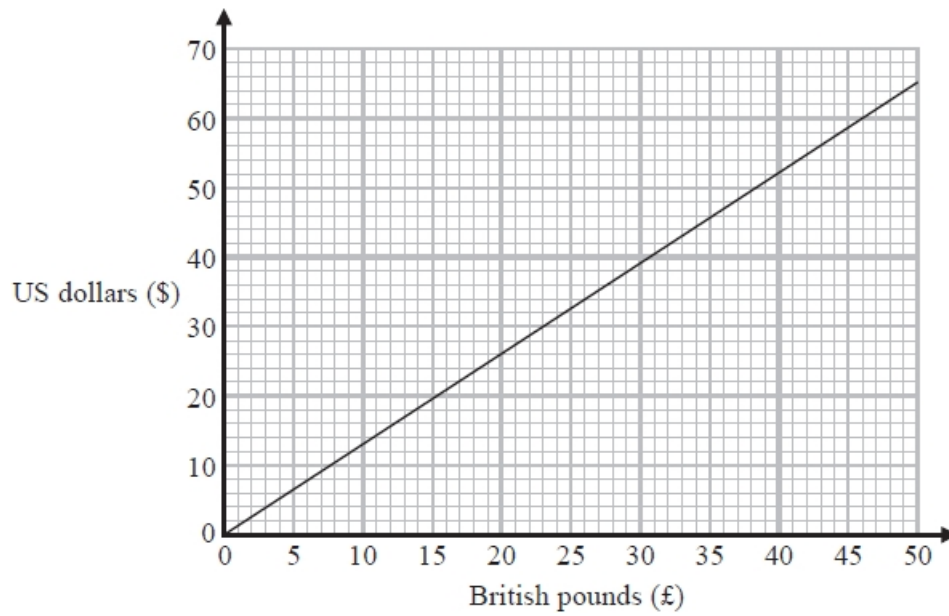
(c) By drawing a suitable straight line on the grid, find estimates for the solutions of

$$x^2 - 3x + 1 = 3$$

(2)

(Total for question = 6 marks)

Q31. This graph can be used to change between US dollars (\$) and British pounds (£).



Rosie bought a ring in the USA. She paid 345 US dollars.
Work out in pounds the amount Rosie paid for the ring.

£

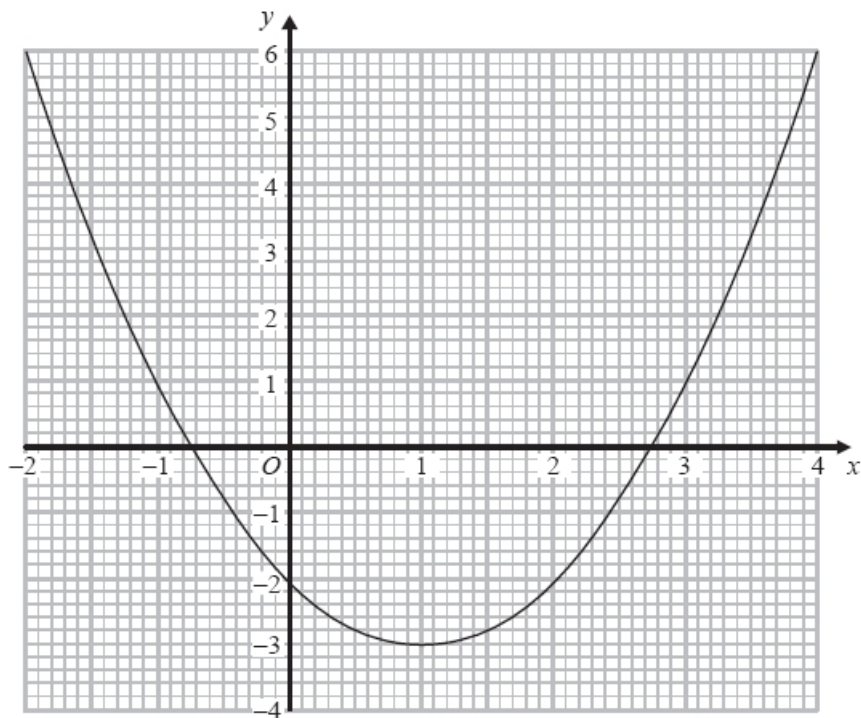
(Total for question = 3 marks)

Q32. The straight line **L** has equation $4x + y = 7$

Find an equation of the straight line perpendicular to **L** that passes through $(-8, 3)$.

.....
(Total for question = 4 marks)

Q33. The graph of $y = f(x)$ is drawn on the grid.



(a) Write down the coordinates of the turning point of the graph.

(..... ,) (1)

(b) Write down estimates for the roots of $f(x) = 0$

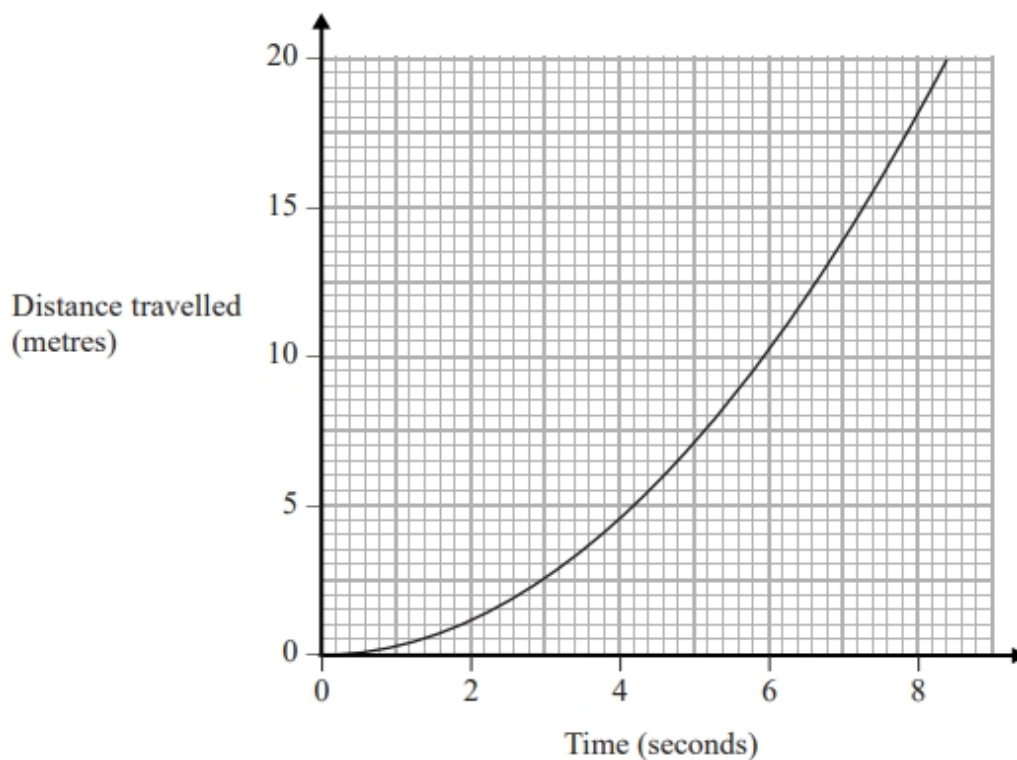
(1)

(c) Use the graph to find an estimate for $f(1.5)$

(1)

(Total for question = 3 marks)

Q34. The graph shows information about part of a cyclist's journey.



Work out an estimate of the speed, in m/s, of the cyclist at time 6 seconds.

..... m/s

(Total for question = 3 marks)

Q35. **C** is a circle with centre the origin.

A tangent to **C** passes through the points $(-20, 0)$ and $(0, 10)$

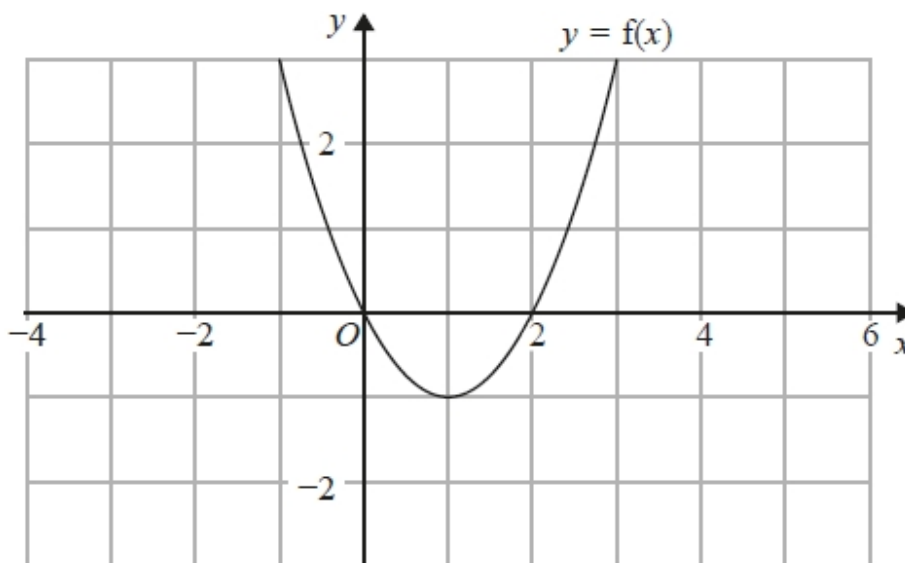
Work out an equation of **C**.

You must show all your working.

.....

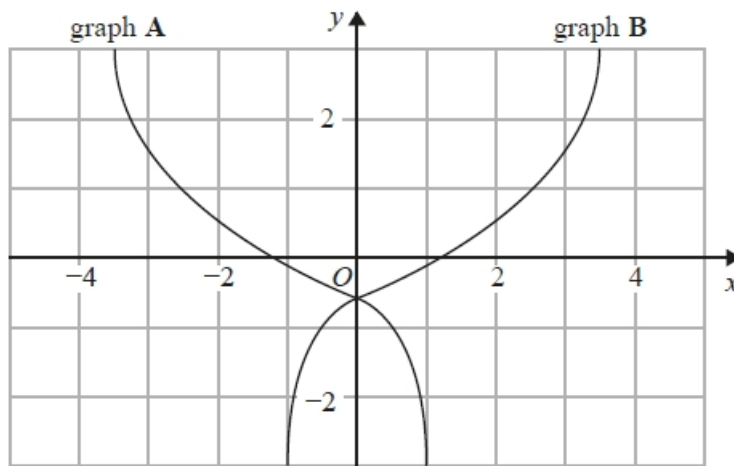
(Total for question = 5 marks)

Q36. The graph of $y = f(x)$ is shown on the grid below.



(a) On the grid above, sketch the graph of $y = f(x - 2)$

(1)



On the grid, graph **A** has been reflected to give graph **B**.

The equation of graph **A** is $y = g(x)$

(b) Write down the equation of graph **B**.

(1)
(Total for question = 2 marks)

Q37. (a) Change 8000 cm^3 to m^3

..... m^3 **(1)**

(b) Change a speed of 180 km per hour to metres per second.

..... metres per second **(3)**

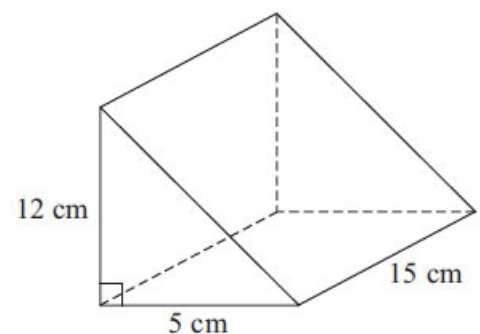
(Total for question = 4 marks)

Q38 The diagram shows a solid triangular prism.

The prism is made from metal.

The density of the metal is 6.6 grams per cm^3 .

Calculate the mass of the prism.



(Total for Question is 3 marks)

Q39. Jade makes an orange drink by mixing orange concentrate with water.
 She mixes 15 cm^3 of orange concentrate with 250 cm^3 of water.
 The density of orange concentrate is 1.20 g/cm^3 .
 The density of water is 1.00 g/cm^3 .
 Work out the density of Jade's orange drink. Give your answer correct to 2 decimal places.

.....g/cm³

(Total for question = 3 marks)

Q40. Here are the first six terms of an arithmetic sequence.

3 8 13 18 23 28

(a) Find an expression, in terms of n , for the n th term of this sequence.

..... (2)

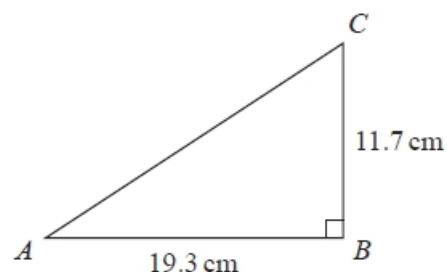
The n th term of a different sequence is $3n^2$
 Nathan says that the 4th term of this sequence is 144

(b) Is Nathan right? Show how you get your answer.

(1)
(Total for question = 3 marks)

Q41. ABC is a right-angled triangle.

Calculate the length of AC.
 Give your answer correct to 3 significant figures.



..... cm

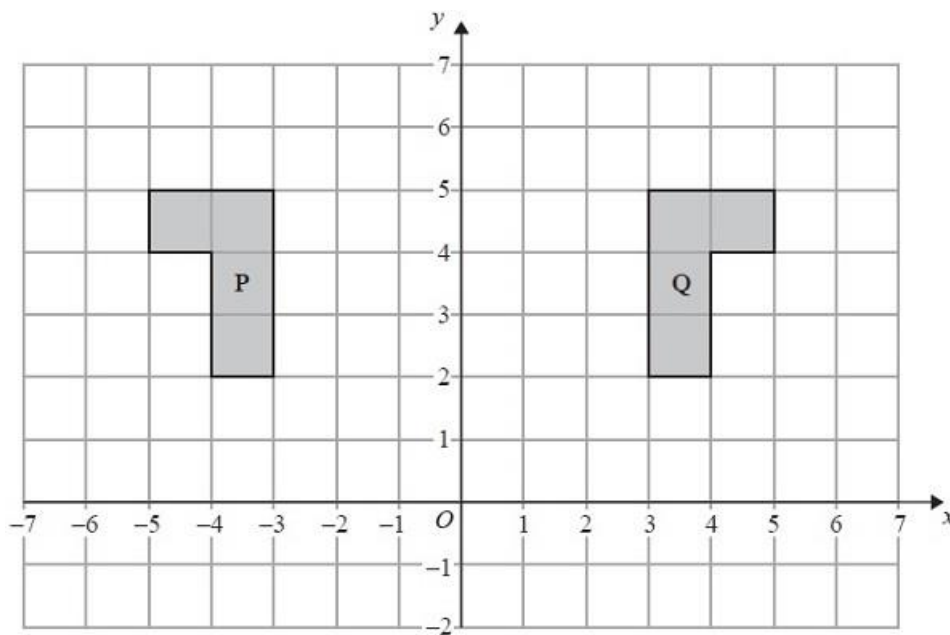
(Total for question = 3 marks)

Q42. Use ruler and compasses to construct the perpendicular bisector of the line AB . You must show all your construction lines.



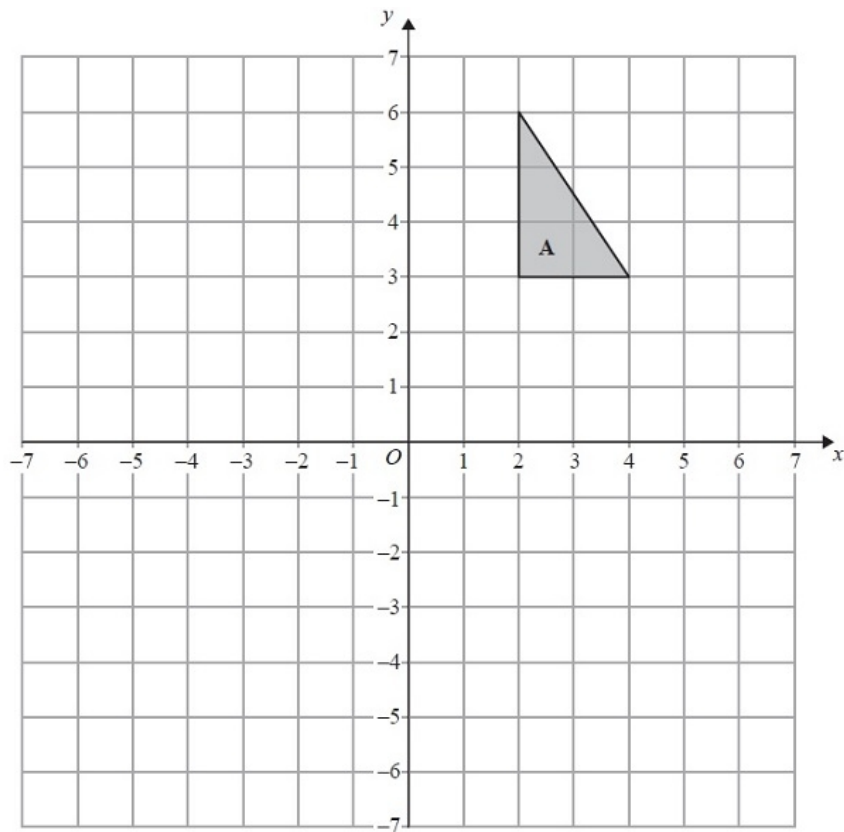
(Total for question = 2 marks)

Q43. Two shapes are shown on the grid.



(a) Describe fully the single transformation that maps shape **P** onto shape **Q**.

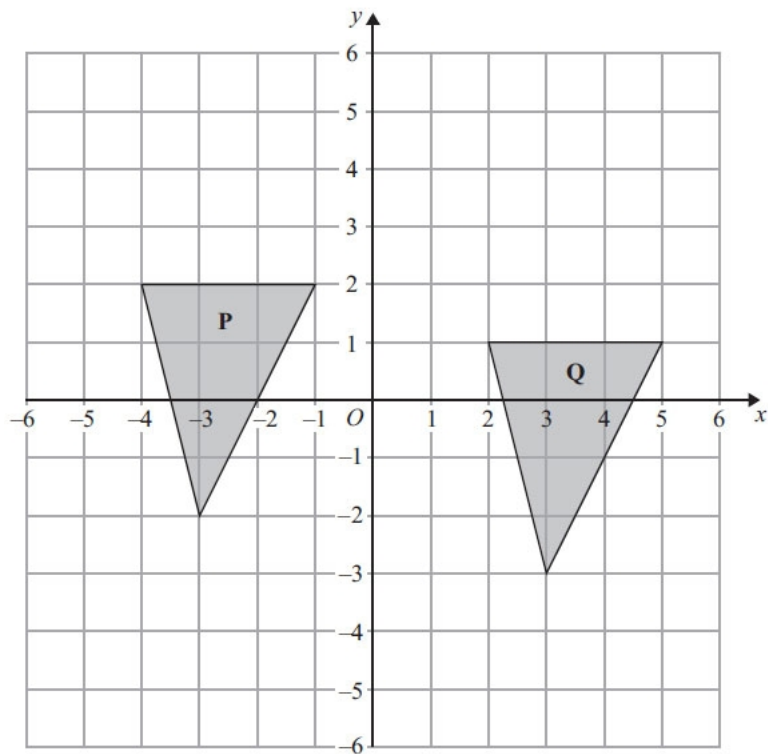
(2)



(b) Rotate triangle **A** 90° clockwise about the point $(0, 2)$. Label the new triangle **B**. **(2)**

(Total for Question is 4 marks)

Q44.



Describe fully the single transformation that maps triangle **P** onto triangle **Q**.

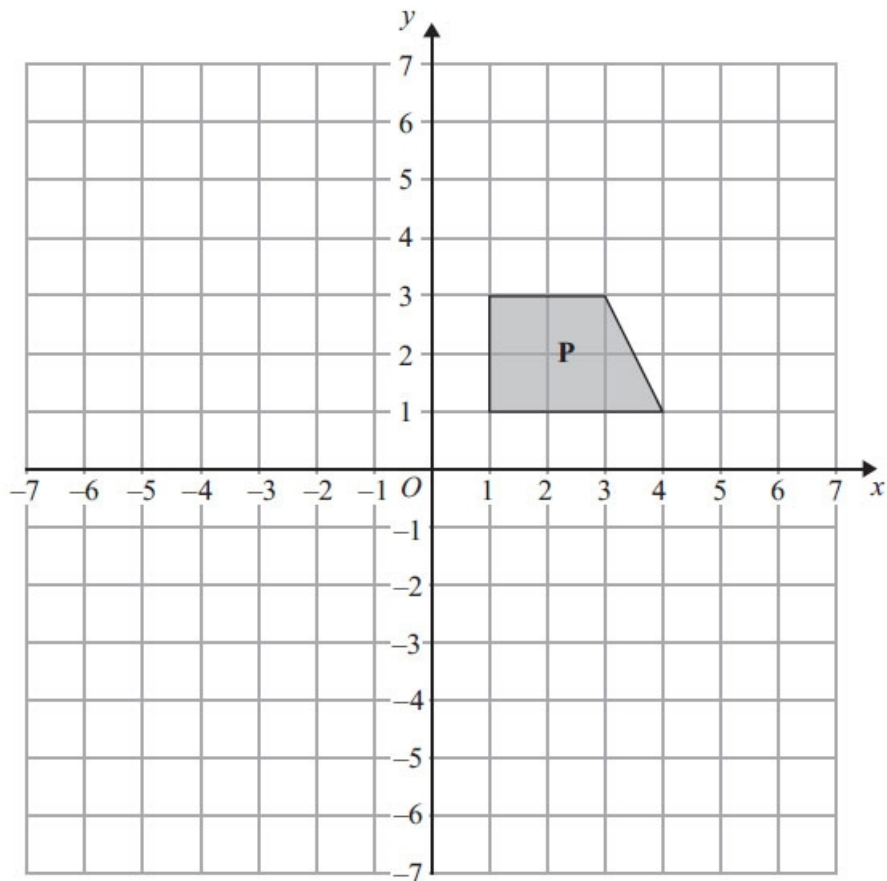
(Total for Question is 2 marks)

Q45.

Shape **P** is reflected in the line $x = -1$ to give shape **Q**.

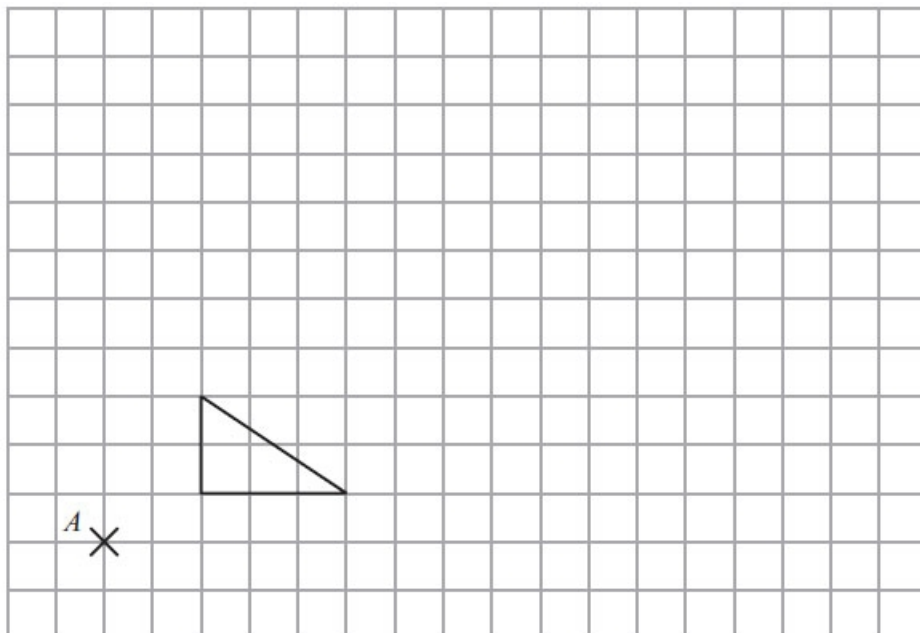
Shape **Q** is reflected in the line $y = 0$ to give shape **R**.

Describe fully the **single** transformation that maps shape **P** onto shape **R**.



(Total for Question is 3 marks)

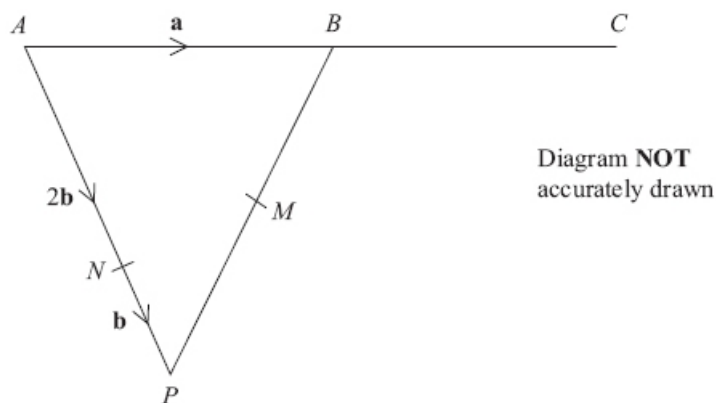
Q46.



On the grid, enlarge the shape with scale factor 3, centre A.

(Total for Question is 3 marks)

Q47.



APB is a triangle.
 N is a point on AP .

$$\overrightarrow{AB} = a \quad \overrightarrow{AN} = 2b \quad \overrightarrow{NP} = b$$

(a) Find the vector \overrightarrow{PB} , in terms of a and b .

(1)

B is the midpoint of AC . M is the midpoint of PB .

(b) Show that NMC is a straight line.

(4)

(Total for Question is 5 marks)

Q48. The expression $x^2 - 8x + 6$ can be written in the form $(x - p)^2 + q$ for all values of x .

(a) Find the value of p and the value of q .

$$p = \dots\dots\dots$$

$$q = \dots\dots\dots \quad \mathbf{(3)}$$

The graph of $y = x^2 - 8x + 6$ has a minimum point.

(b) Write down the coordinates of this point.

$$(\dots\dots\dots, \dots\dots\dots) \quad \mathbf{(1)}$$

(Total for question = 4 marks)

Q49. Solve $3x^2 + 6x - 2 = 0$

Give your solutions correct to 2 decimal places.

.....
(Total for question = 3 marks)

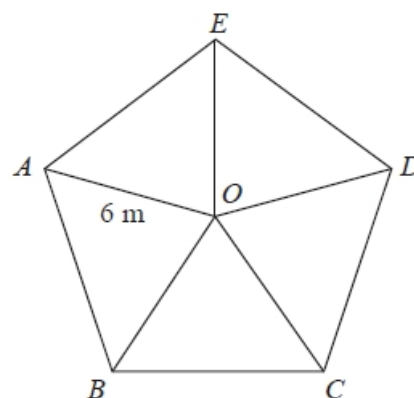
Q50. The diagram shows a regular pentagon $ABCDE$.

The pentagon is divided into 5 isosceles triangles.

$OA = OB = OC = OD = OE = 6\text{ m}$

Work out the area of the pentagon.

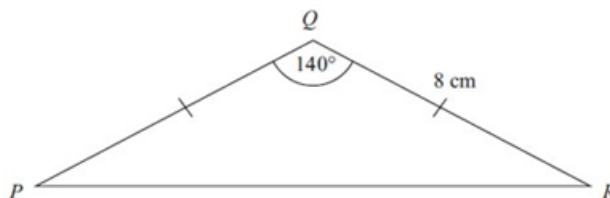
Give your answer correct to 1 decimal place.



..... m^2

(Total for question = 4 marks)

Q51. Calculate the length of PR . Give your answer correct to 3 significant figures.

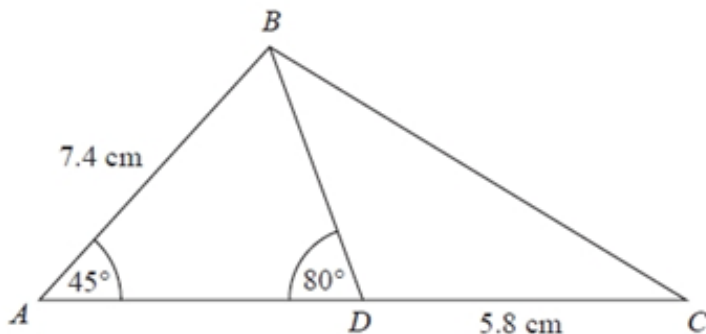


..... cm

(Total for Question is 3 marks)

Q52.

ABC is a triangle.
 D is a point on AC .
Angle $BAD = 45^\circ$
Angle $ADB = 80^\circ$
 $AB = 7.4$ cm
 $DC = 5.8$ cm



Work out the length of BC .
Give your answer correct to 3 significant figures.

..... cm

(Total for question = 5 marks)

Q53. (a) Factorise $x^2 + 5x + 4$

(2)

(b) Expand and simplify $(3x - 1)(2x + 5)$

(2)

(c) Write as a single fraction $\frac{1}{2x} + \frac{1}{5x} - \frac{1}{3x}$

(2)

(Total for Question is 6 marks)

Q54. Toga wants to estimate the number of termites in a nest.

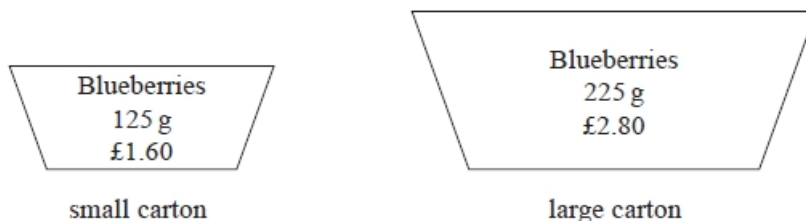
On Monday Toga catches 80 termites.
He puts a mark on each termite.
He then puts all 80 termites back in the nest.

On Tuesday Toga catches 60 termites.
12 of these termites have a mark on them.

Work out an estimate for the total number of termites in the nest.
You must write down any assumptions you have made.

.....
(Total for question = 4 marks)

Q55. Blueberries are sold in small cartons and in large cartons.



There are 125 g of blueberries in a small carton. Each small carton costs £1.60

There are 225 g of blueberries in a large carton. Each large carton costs £2.80

Which size of carton is the better value for money? You must show your working.

Total for question = 3 marks)

Q56. Solve, by factorising, the equation $8x^2 - 30x - 27 = 0$

.....
(Total for Question is 3 marks)

Q17. Solve the equations

$$x^2 + y^2 = 36$$

$$x = 2y + 6$$

.....
(Total for Question is 5 marks)

Q58.

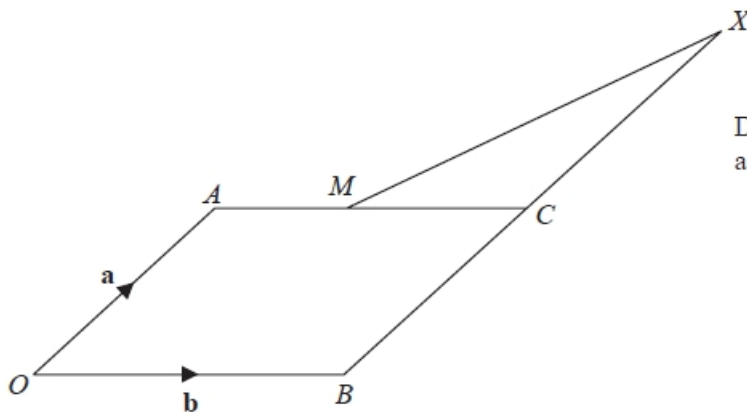


Diagram NOT
accurately drawn

OACB is a parallelogram.

M is the midpoint of AC.

C is the midpoint of the straight line BCX.

$$\vec{OA} = \mathbf{a} \quad \vec{OB} = \mathbf{b}$$

Prove that OMX is a straight line.

(Total for Question is 4 marks)

Q59. The table shows some information about the weights of oranges.

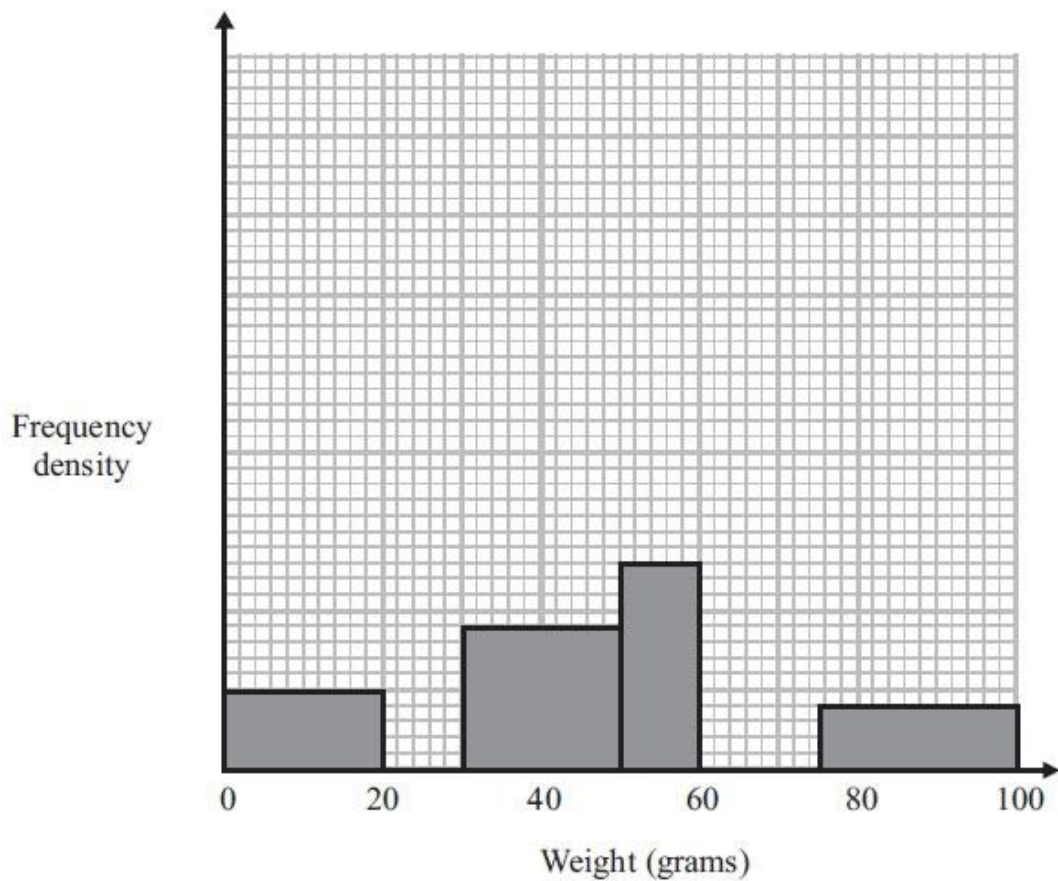
Weight (w grams)	Frequency
$0 < w \leq 20$	
$20 < w \leq 30$	15
$30 < w \leq 50$	
$50 < w \leq 60$	13
$60 < w \leq 75$	15
$75 < w \leq 100$	10

(a) Use the histogram to complete the table.

(2)

(b) Use the table to complete the histogram.

(2)



(Total for Question is 4 marks)

Q60. There are 200 workers at a factory.

The cumulative frequency table gives information about their ages.

Age (a years)	Cumulative frequency
$0 < a \leq 20$	25
$0 < a \leq 30$	70
$0 < a \leq 40$	138
$0 < a \leq 50$	175
$0 < a \leq 60$	186
$0 < a \leq 70$	194
$0 < a \leq 80$	200

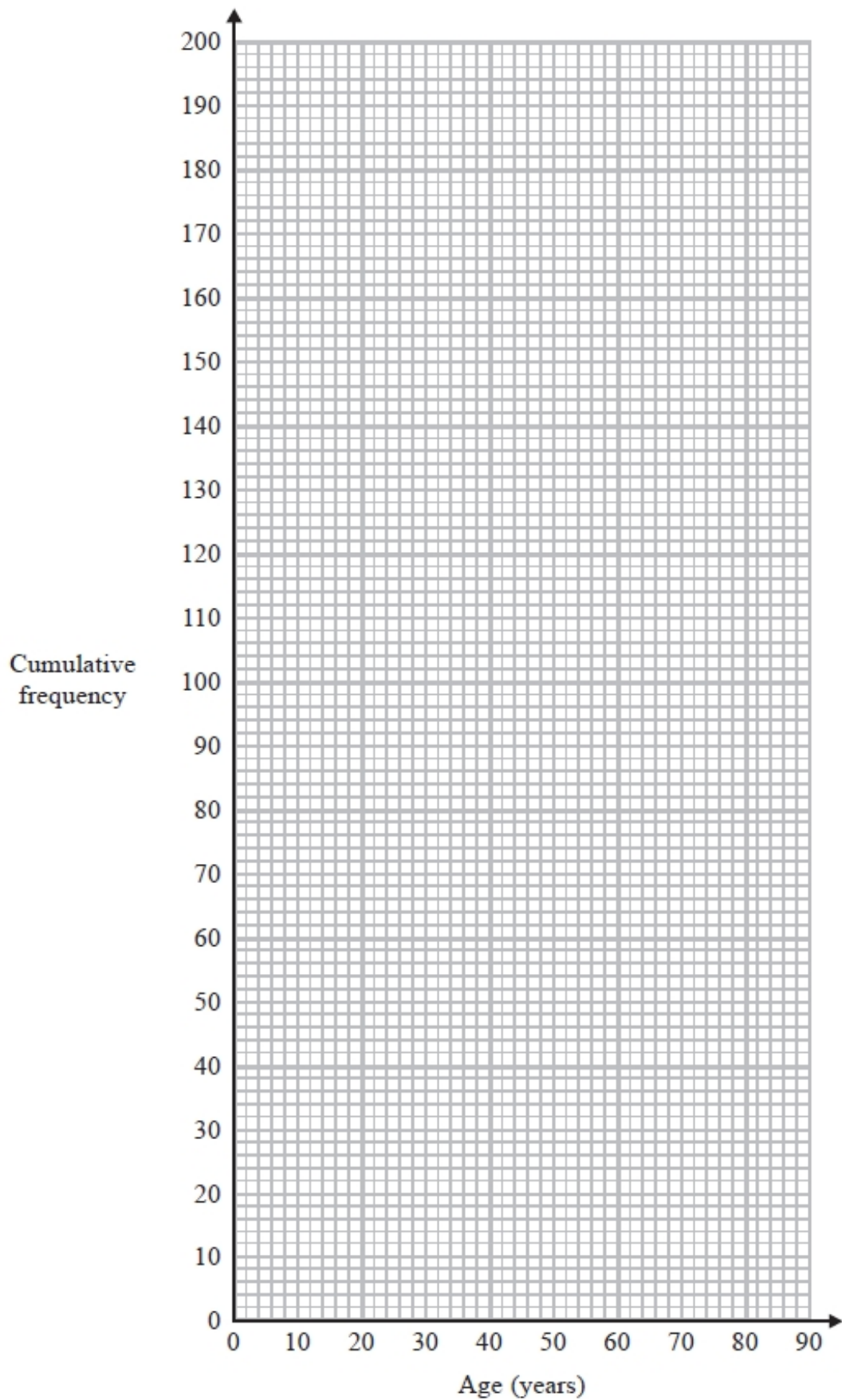
(a) On the grid, draw a cumulative frequency graph for this information.

(2)

(b) Graham says: "10% of workers at the factory are older than 65"

Is Graham correct? You must show how you get your answer.

(2)



(Total for Question is 4 marks)

Q61. Here is part of a train timetable from Cambridge to London Kings Cross.

Cambridge	08 15	08 50	09 20	09 27	09 50
Royston	08 29	09 05	09 35	09 44	10 05
Letchworth	08 39	09 14	09 44	09 55	10 14
London Kings Cross	09 10	09 45	10 13	10 32	10 43

Matt is going to catch a train from Cambridge.
He needs to get to Letchworth **before** 10 00

(a) Write down the time of the latest train Matt can catch from Cambridge.

(1)

The 09 35 train left Royston on time.

The train took 50 minutes to travel from Royston to London Kings Cross.
The train was late when it got to London Kings Cross.

(b) How many minutes late?

minutes **(2)**

(Total for question = 3 marks)

Q62. David drives to the supermarket on his way home from work.

The table shows some information about his journey.

	Time
Leaves work	17 30
Gets to supermarket	17 45
Leaves supermarket	18 10

(a) How many minutes is David at the supermarket?

..... minutes **(1)**

David leaves the supermarket at 1810 He drives 20 miles to his home.
The speed limit for the journey is 30 mph.

David drives within the speed limit.

(b) Can David get home before 1900? Give reasons for your answer.

(3)

(Total for question = 4 marks)